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ABSTRACT

In studies of retention of verbal material adults have repeatedly remembered less than younger adults have. A study was conducted which asked older adults to remember an experienced event, retention of experiences being considered a better indicator of functioning ability than retention of word lists. In an initial study, older adults' recall was found to be better in a meaningful context but was still not as good as the younger adults' recall. To test if better instructions would yield improved results, a follow-up study was conducted. Participants included 10 older adults aged 60-79 years from a college alumni association and 10 younger adults aged 18-20 from a college psychology class. Participants were told to make clay and then form shapes from it. Participants were informed that they would be asked to report everything they could remember about the procedure. A videotape was shown to illustrate the type of details to be remembered. Memory for four types of information was examined: superordinate and subordinate actions of clay-making and shape-making. The results indicated that only subordinate shape-making recall was lower for older adults than for younger adults. The organization of a meaningful context and additional instructions may have helped older adults' recall improvement in the second study. Further research should examine context-relevant memory although context support does not completely compensate for memory decline. (ABL)

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Adults' Event Recall: Is Context Enough?

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Abstract

Because the memory demands of older adults center more on memory for events than retention of word lists or story passages, older and younger adults' recall of a hierarchically-organized event was tested. With an experimenter, subjects made clay according to a prescribed recipe and then created shapes from the clay. Immediately after and a week later they were asked to report what they remembered about the events. Prior to participation, subjects viewed a videotape which indicated how the events were to be recalled. These instructions were provided because in a previous study older adults reported less information than younger adults and despite our verbal instructions they omitted many details. In contrast to our earlier results, older adults did report as much information as the young immediately after the event. A week later, however, recall declined and was lower than the performance of the young. Additional analyses revealed that even immediately after the event certain types of information were reported less completely or less accurately than the young. Memory for day-to-day activities may be less deficient than memory for verbal materials, although it appears that the memory support that context provides is not enough to compensate for memory decline more typically observed.

Adults' Event Recall: Is Context Enough?

Most of our knowledge about life-span changes in memory comes from studies involving retention of verbal materials. These studies have demonstrated repeatedly that older adults remember less than younger adults (e.g., Craik, 1977). To a large degree, however, the memory demands of older adults center more on memory for events than memory of word lists or story passages. Because events comprise everyday experience and much of the content of conversational exchanges, older adults' ability to remember experienced events would provide a more accurate view of day to day functioning.

To recreate events as usually encountered in everyday life, procedures involving an individual's participation in an orchestrated situation are required. Under these conditions event content is known because most actions and dialogue can be carefully controlled and execution of the event precisely recorded. To our knowledge, this approach has been used previously in only two studies (Kausler and Hakami, 1983; Kausler, Lichty, and Freund, 1985). We built on and extended this approach in an initial study we conducted in which older and younger adults participated in two standardized, hierarchically-organized events involving making clay and fashioning shapes from the clay. These events were designed to simulate events naturally occurring which would involve following a recipe or instructions to make a product

(e.g., cooking dinner, sewing a dress, building a cabinet, etc.). Immediately following participation in the events subjects were interviewed for their memory of them and again approximately a week later to determine how event memory changes with age and over time.

Each event was comprised of a set of superordinate actions which organized and were defined by a number of subordinate actions. For example, in clay-making one of the superordinate actions was "adding the dry ingredients," which was made up of the subordinate actions "measuring" and "adding the salt, flour, and cinnamon." This hierarchical organization reflected current views on the structure of story events (e.g., Mandler, 1984). An overall or superordinate goal is represented at the top of the hierarchy and a series of subgoals with means necessary to accomplish them is embedded underneath (e.g., Lichtenstein and Brewer, 1980). As the level in the hierarchy increases the centrality and importance also increases (e.g., Omanson, 1982). Accordingly, information higher in this hierarchical representation is expected to be more accessible and therefore more easily produced than information lower in the hierarchy. Thus, superordinate goals and important information should be better remembered than less central information. The structure of the events in which subjects participated in our study is depicted in Figure 1.

In our initial investigation, twenty older adults averaging 68 years of age and 19 younger adults averaging 21 years participated in each event. Memory for three of the four types of information tested was equivalent for old and young and did not change over time. Old and young remembered clay-making and clay-shaping superordinate actions and clay-shaping subordinate actions equally well but the young reported more subordinate clay-making actions. Thus, there was evidence that older adults remember information embedded in a meaningful context better than other kinds of materials. Thus, age differences occurred despite the contextual support.

Superordinate actions were recalled more frequently than subordinate actions by both age groups in the clay-shaping event but not more frequently in the clay-making event. Nevertheless, more important actions were recalled better than those rated of low importance. Thus, the hierarchical model which characterizes prose recall generalized to some extent to event recall. Age differences, however, could not be accounted for within this model. We wondered if older adults may have recalled as many of the most central actions as young adults. Age differences, however, were found at each hierarchical level. There was some tendency, though, for older adults to summarize their recall. When more than one action was performed on an object older adults seemed more likely to report only one. Thus in a second study

presented here we more explicitly defined the information subjects were expected to recall and the level of detail we expected. If older adults really remember as much information as young people but are less certain what they are to encode or report, then clearer instructions should lead to better performance. If performance differences remain, however, then context support would appear to be inadequate to compensate for memory inefficiencies more typically found.

Method

Participants

Ten adults at each of two groups participated in the follow-up study. Older adults were members of the University Alumni association and ranged in age from 60 to 79 years (mean = 70.4 years). Young adults were college students enrolled in an honors psychology class. They were an average of 19.3 years old and ranged in age from 18 to 20. Older adults had received an average of 16.3 years of education and young adults 13.5 years.

Procedure

Subjects in the follow-up study were told that they were participating in an educational program to develop a task that an adult could teach a child. The task was to make clay and then form shapes from it. Participants were told that we were interested in in how easily adults could learn the procedure themselves just by going through it once. The experimenter

explained that when the clay-making procedure was complete, they would be asked to report everything they could remember about the procedure. They were told that every detail was important and should be included.

Participants in this study were also shown a brief instructional videotape prior to making clay. The videotape showed an older woman taking a tour of an historic house with the experimenter and afterwards recalling what she had seen. The videotaped interview was designed to ensure that the participants in the clay-making study knew they should: 1) not summarize details of the procedure, 2) guess if they were unsure of something that had happened, and 3) report all details no matter how trivial they might seem. After the videotaped instructions were presented, the experiment was begun.

The standardized event was comprised of 37 subordinate target actions, half of which were carried out by the participants and half by the experimenter. Each action was defined as belonging to one of four superordinate nodes: getting ready, adding dry ingredients, adding liquid ingredients, and mixing the clay together. These four nodes were subsumed by one higher node: making clay (see Figure 1). Every action in the event was labeled by the experimenter before it was performed. Before the event was begun, the participants were told that they were going to make clay. Throughout the event, each of the four nodes and all of the

actions subsumed under each were described by the experimenter as they were being carried out (e.g., "I'll put the flour in the bowl" and "Could you pour some water in the cup"). Following completion of the clay, the subject and the experimenter fashioned shapes from the clay for approximately five to ten minutes.

Following the event, participants were interviewed for their memory of the event. They were instructed to recall everything they could about the procedure and to report every detail they could remember. All participants were interviewed a second time between seven and ten days later. At the second interview, they were reminded of the videotaped instructions and again encouraged to report everything they could remember about the clay-making event.

Audiotapes of the interviews were later transcribed and scored for the proportion of actions recalled. Each action was scored as either a superordinate unit, involving actions at the top of the hierarchy or a subordinate unit, involving actions enabling the accomplishment of the superordinate goals. Participants received one point for each action accurately recalled from the list of 5 superordinate and 37 subordinate actions that comprised the clay-making event. Recall of the play-shaping event was not scored because no age differences had been found earlier in reporting this event.

The actions of the clay-making procedure were also rated for

importance by a class of 90 undergraduate psychology students. They indicated on a seven point scale, how critical each action was to eventually producing the clay. The actions were then divided into three levels of importance based on the mean scale value of each.

Results

All analyses were conducted on the proportion of actions accurately recalled. Because superordinate and subordinate recall was not correlated, they were analyzed separately. Superordinate recall was analyzed in a 2 (age) X 2 (time of interview) analysis of variance. No significant main effects or interactions were found for recall of superordinate information (mean older = .20, sd = .17, mean younger = .30, sd = .20).

Table 1 shows the mean proportions of correct recall for subordinate information as a function of age, time of interview, and level of importance. Table 1 also includes the Study 1 data for comparison. These proportions were analyzed in a 2 (age) X 2 (time of interview) X 3 (importance level) analysis of variance. Main effects of importance level F (2,36) = 147.3, $p < .001$, and time of interview, F (1,18) = 7.90, $p < .05$ were both significant. The interaction between age and time of interview was also significant, F (1,18) = 7.60, $p < .05$. However, no significant main effect was obtained for age.

Actions rated as most important were correctly recalled more

often than those of moderate importance, which were in turn recalled better than those of low importance (EW < .10). Overall, actions were remembered less well at Time 2 than at Time 1; however, this decline occurred only for the older adults.

Recall was also examined within each of the four superordinate nodes: get ready, add dry ingredients, add liquid ingredients, and mix clay together. Table 2 shows the proportion of recall as a function of age, time of interview, and node. These proportions were analyzed in a 2 (age) X 2 (time of interview) X 4 (node) analysis of variance. In addition to the main effects of time of interview and the interaction of time and age noted before, there was a significant node effect, F (3,54) = 26.53, $p < .001$, and a marginally significant, F (3,54) = 2.21, $p < .10$, interaction between node and age. There was no age differences in node recall for get ready and add liquid nodes, but age related recall differences were present for the other two nodes, add dry ingredients and mix together (EW < .10). Further analyses of the percentage of subjects recalling each action suggested that the older adults tended to be at a disadvantage in recall when two actions were performed on the same object. Older adults typically reported one, but not both actions, and they were somewhat more likely to report the first action which enabled the second. For example, measuring flour into the cup was more often recalled by older adults than putting flour in the bowl.

A final analysis was conducted to determine if older adults were more successful in remembering the actions that they themselves had performed. A 2 (age) X 2 (actor) X 2 (time of interview) analysis of variance revealed a significant effect of actor, F (1,18) = 19.80, $p < .001$, and a marginally significant interaction of age, actor, and time, F (1,18) = 2.93, $p < .10$. Overall, self actions were recalled better than other actions, but this difference was smaller for older adults. Older adults recalled more self actions only at Time 1 (see Table 3). Further analyses showed that more errors were made when recalling self actions. That is, subjects were more likely to misremember the actor when actions had been carried out by themselves. These errors were more likely for older adults at Time 1 and more likely for young adults at Time 2.

Discussion

Old and young adults were asked in this study to participate in a standardized, hierarchically-organized event and then recall it immediately after and a week later. We wanted to know if age differences between old and young would disappear if memory for an event were tested in a meaningful context. The answer to the question appears to be sometimes, as long as recall instructions are specific. In an initial experiment, memory for four types of information was examined: super- and subordinate actions in two events, clay- and shape-making. For all but subordinate actions

in the clay-making event, recall of young and old was equivalent, even after a week's delay. In a follow-up experiment reported here we looked again at memory for the clay-making event. This time subjects were told that they would be expected to remember actions labeled for them, that they should not summarize details, and that if they were uncertain about an action, they should guess what happened. Memory of the event did not change for young adults, but older adults reported more information than in the first study, typically as much as the young, at least immediately after the event. Thus, the organization that a meaningful context provides or which is embedded in an event may help older adults overcome memory difficulties usually observed.

But is context enough to eliminate all recall differences between old and young? First, recall instructions had to be very explicit. Older adults apparently had difficulty knowing what information to report and even then did not uniformly recall as well as younger adults. Despite our instructions they still seemed to omit details. When more than one action was performed on an object they seemed more likely to mention only one. As a result, when actions were assessed node by node actions within some nodes were less often reported. Furthermore, recall declined a week later after the event, in contrast to the findings in our initial study. Interestingly enough, recall at Time 2 was very similar to the level obtained in the original study. This

suggests that older adults may have tried harder immediately after the event to remember information less accessible in memory and then failed to report the same information at Time 2. If so, then in our first experiment older adults probably did not report this information at either Time 1 or Time 2 which would have resulted in the stable memory we observed. The pattern of recall for actor information seems to support this interpretation. Older adults made more errors recalling the actor of an action during the first interview when overall recall was improved. This suggests that memory may have been stressed even immediately after the event and that errors were made in compensation. This interpretation was strengthened by finding that errors decreased at Time 2, a week later, when overall recall also declined. It appeared as if older adults could either remember as many actions as the young or recall actions accurately but not both.

Another purpose of the study was to determine how certain structural characteristics of events influence older adults' memory. We asked if actions most central to the goal of the event would be better remembered just as they tend to be in stories. Each event was organized into two levels. The superordinate level was comprised of summary statements that described the primary goals of the event. The subordinate level was composed of the actions that were necessary to achieve the higher goals. In the clay-shaping event tested in our original study these higher goals

were better remembered than the subordinate actions; however, in the clay-making event, memory for the subordinate actions was either the same or better. This result was replicated here. Thus without a narrative discourse these summary statements are not always better remembered, and, in fact were less well remembered by the young. Further research will be needed to determine the conditions under which superordinate categories are reported. Nevertheless, the "levels" effect did emerge within the subordinate category. Actions rated as most important in making the clay were better remembered by both old and young than those of moderate importance, which were in turn remembered better than those of low importance. Thus, older adults are clearly sensitive to the goal structure of an event and their memory is influenced by it.

The results of these studies clearly suggest that if a more complete picture of adults' memory functioning is desired, memory tasks and materials traditionally studied must be expanded to include contextually-relevant information. Memory for day-to-day activities may be less deficient than memory for verbal materials, although it appears that the memory support that context provides is not enough to compensate for memory decline associated with age.

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Table 1

Mean Proportions of Accurate Recall (Experiments 1 and 2)

Experiment	Importance Level	Age	Time of Interview	
			Immediate	Delayed
1	High	Old	.527	.523
		Young	.749	.603
	Medium	Old	.260	.287
		Young	.533	.519
	Low	Old	.105	.075
		Young	.321	.247
2	High	Old	.685	.485
		Young	.723	.708
	Medium	Old	.533	.360
		Young	.513	.533
	Low	Old	.163	.080
		Young	.218	.209

Table 2

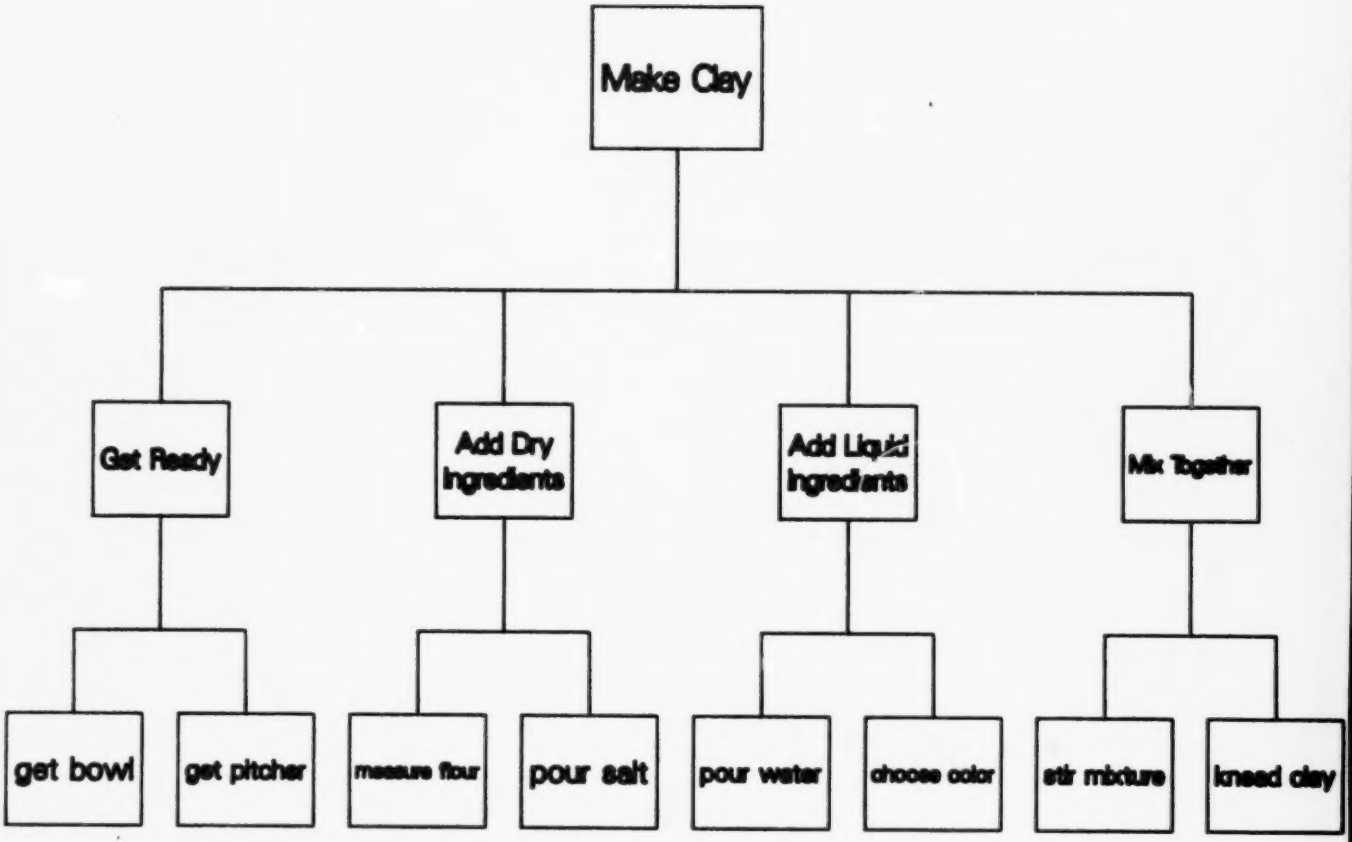
Mean Proportions of Accurate Node Recall

Experiment	Interview	Age	Node			
			Get Ready	Add Dry	Add Liquid	Mix Together
1	Immediate	Old	.157	.424	.620	.410
		Young	.367	.714	.884	.633
	Delayed	Old	.175	.464	.630	.330
		Young	.330	.631	.789	.642
2	Immediate	Old	.350	.586	.800	.600
		Young	.300	.786	.760	.740
	Delayed	Old	.218	.414	.560	.420
		Young	.309	.700	.800	.760

Table 3

Mean Proportions of Accurate Actor Recall

Experiment	Age	Actor	Time of Interview	
			Immediate	Delayed
1	Old	Self	.350	.337
		Other	.260	.275
	Young	Self	.643	.565
		Other	.440	.405
2	Old	Self	.547	.353
		Other	.420	.295
	Young	Self	.574	.595
		Other	.435	.410



The top two levels show superordinate actions.
The lowest level shows subordinate actions.

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